



THE SWORDSMAN

Issue 40, May 2018

The Worshipful Company of Engineers

(Incorporated by Royal Charter 2004)



The Swordsman

Issue 40 May 2018



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From the Editor

HM Government has designated 2018 as the Year of Engineering. This is significant because the nation's need for more engineers is becoming acute. As a nation we cannot rely on importing engineering talent to make up for the shortages of home grown engineers.

The need to encourage more young people to choose engineering careers is not a new concern, so what makes 2018 so special? It could be that the UK leaves the EU in March 2019 and HMG have suddenly realised we need more engineers or was it prompted by 2018 being the bi-centenary of the Institution of Civil Engineers. No matter, The Worshipful Company of Engineers will be doing its best to spread the word that engineering is a fulfilling career and wants the campaign to be outstandingly successful.

One of our liverymen, Dame Judith Hackitt is leading the Independent Review of Building Regulations and Fire Safety. The interim report was published 18 December 2017. The final report is due imminently.

It is fortunate for the reputation of the engineering profession that our failures are not often recognised

as such by the general public. Whereas in the case of a bridge collapse, as at the University of Miami in March of this year, the visual impact is immediately understood to represent a failure. By contrast another engineering 'failure' was disclosed in January in connection with two processor flaws called Spectre and Meltdown that left nearly every modern computing device vulnerable to hackers. The flaws exposed users of computers and devices with the flawed microprocessors to commercial, financial and data security risks. CSO magazine says, '*The flaws are so fundamental and widespread that security researchers are calling them catastrophic*'. Nobody has admitted to any losses!

The good news is that the new Master, David Johnson has said that his theme for the coming year is 'Digital Engineering'!

Finally, the sort of news that we all like to read would include significant anniversaries, prizes and honours so, if there are any of you have something special to say or promote please write to and let me know so it can be included in the Swordsman.

Raymond Joyce

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THE ANNUAL BANQUET AT THE GUILDHALL, CITY OF LONDON *25 October 2017*



The Master began his speech with a reminiscence of his first visit to the Guildhall at the age of nine with his father.

The site of the Guildhall, explained the Master, was formerly the site of the largest Roman amphitheatre in Britannia (still visible in the basement), and the main part of Guildhall dates from 1440. It is the only secular stone building in London to have survived the Great Fire of 1666 and is now the venue for the annual Lord Mayor's Banquet.

Representing the Lord Mayor was the Aldermanic Sheriff Timothy Hailes who is a Managing Director & Associate General Counsel in the Investment Banking Division of JPMorgan Chase & Co.

The Master listed the Sheriff's City connections; a liveryman of the City of London Solicitors' Company, and the Worshipful Company of International Bankers, a freeman of the Worshipful Company of Pewterers and a member of The Royal Institute of International Affairs (Chatham House). He was elected Alderman for the Ward of Bassishaw in The City of London in May 2013, the same year he was also appointed as a Justice of the Peace.

The Sheriff was accompanied by Fiona Adler, who was a former sheriff, and trained in structural

engineering. She was the first female to be Master of the Worshipful Company of Tobacco Pipe Makers, and is a neuro linguistic coach. The Master remarked that as Sheriff with Andrew Parmley, they became an unofficial comedy duo that year to rival Morecambe and Wise.

The Lord Mair was a guest of the Master. Robert Mair is currently Director of Research – Cambridge University Engineering Department and a specialist in Geotechnics. He was the Sir Kirby Laing Professor of Civil Engineering 2011-2017, (Kirby Laing being the son of John Laing, and the inventor of the Thermalite Block that we all know in our buildings), and was Master of Jesus College Cambridge 2001-2011.

Throughout his career, Robert Mair has specialised principally in underground construction, providing advice on many projects worldwide. In the UK, these include the design and construction of the Jubilee Line extension for London Underground, the Channel Tunnel Rail Link (now HS1) and Crossrail projects. Robert is a Fellow of the Institution of Civil Engineers, a Fellow of the Royal Academy of Engineering (its senior Vice President 2008-2011), and a Fellow of the Royal Society. On 7th November, he would become (and is now) President of the Institution of Civil Engineers. He is



also a Liverymen of the Company. The Master warmly welcomed Robert Mair and his wife Margaret.

Other guests included Lt. Commander Mark Moulding who is the Senior Naval officer supervising the construction of HMS Anson and his wife Naomi. HMS Anson is one of the new Astute Class Nuclear powered submarines in which the Company is taking a keen interest.

The Master's personal guests included a 'rising star' in the Fruiterers Company, Chris Hutchinson and his wife, who is also Chair of Spitalfields Market Tenants Association, the Master's cousin Janet; and former Naval Attaché in Berlin, Captain Dickon Wilkinson, with his wife Ali. There was also a large contingent from Ingenieurs et Scientifiques de France, some of whom are also Liverymen.

The Master recalled a theme from the current Lord Mayor, Andrew Parmley, concerning enthusing young persons and employers to re-invent apprenticeships. At his Installation the Master, had spoken about the perceived low profile of engineering in the UK, and it starts with young people. The Master elaborated further as follows.

'If we go back to the 70's, there were around 500,000 good quality apprenticeships in the UK, and the youngsters who were most suited to training in the trades and professions were routed through the Technical Colleges and/or the apprenticeships; as they still are in Germany and France for instance. Come the 90's however, and the Blair government Mantra: Education; 50% of kids must go to university etc. Apprenticeships fell to approximately 50,000 and many technical / vocational colleges were re-invented as universities, offering often low quality courses.

Now, we have a bit of a new dawn, in the form of the Apprenticeship Levy; this basically takes money off medium and larger sized organisations and gives it back if they offer apprenticeships. The target is 3 million quality apprenticeships by 2020. At present, we have just over 1 million, so a huge improvement on the dark days 20 years ago, however many of them are Grades 2 and 3, low quality, not much above NVQ level. Meanwhile, 20% of 16-24 year

olds in London are unemployed and 23% have been for two years. Additionally, there are two other problems:

- *According to the I Mech E, in a study last year backed by Tata, Britain's education system is currently unable to turn out enough people with the right skills to be Chartered Engineers, Technicians or Apprentices*
- *University obsessed parents are not envisioned and are blocking the process: those that went to university want the same for their children, those that didn't want what they didn't have, to some extent regardless of what the young person is suited to.*

So I have three challenges for you as influential engineers:

1. *Go back to your organisations and start encouraging more good quality apprenticeships. I heard a presentation last week from IBM, who started with 14 apprentices 4 years ago and now have 350 at various stages in Grades 3 to 6 (6 being a degree apprenticeship or equivalent). They say... "Our apprentices just WOW us!"*
2. *Encourage other activities and contacts with young people, particularly those who are not in Employment, Education or Training. Latest figures from Livery Schools Link show that just 4 contacts or activities from people like us, means a young person is 5 times less likely to be a NEET and will on average enjoy 16% more salary when they are employed.*
3. *We need to make engineering COOL. I have stood in front of groups of school kids and told them enthusiastically that they could be involved with amazing projects like Crossrail or the Queensferry Crossing and they just yawn. Thinking back, I was once told by London Transport, as a new graduate engineer, that I could have an exciting career designing bridge abutments...and later when I got experienced... larger bridge abutments. Not exactly motivational stuff. But recently Janet and I were at a Haptics exhibition at*



the Royal Academy and both of us donned virtual reality goggles so that we could learn how to inject patients with anaesthetic using virtual syringes that resisted as they were used (I won't go into more details). Now that was COOL. And if you think that example was not main stream engineering, there is the good example given by Boeing's MECA programme (Making Engineering Cool Again).

So the take away from this evening is for you all to think about how to make engineering careers more

attractive and desirable; as they clearly were for us.'

The Master thanked all the different persons and groups that had made the evening special including the caterers Party Ingredients; the Live Brass Quartet, plus an additional trumpeter to play the Posthorn Gallop; the Chaplain Peter; the photographer John Deehan; and last but definitely not least, the Company's Events Coordinator Sandra.

The Master finished by proposing the Civic Toast: *The Lord Mayor, the City of London Corporation and the Sheriffs!*



A personal perspective!

The evening commenced with a splendid sparkling wine reception at which I was made to feel welcome, as a relatively new Liveryman, by the Master and Wardens.

During the dinner of perfectly cooked venison matched with a particularly good Cotes du Rhone, the Live Brass Quintet gave a spirited rendition of the Post Horn Gallop with horn players strategically placed either side of the Guildhall, which was both atmospheric and fun in equal measure.

The principal guest and speaker for the evening was Professor Lord Mair who began his uplifting address with an analysis of an ongoing minor identity matter between himself as The Lord Mair, and the Lord Mayor, both being correct forms of address. We

were reassured that the answer lay in the subtle emphasis placed on the *“the”*!

He closed with a splendid quote from our first honorary Liveryman, HRH Prince Philip; “everything that wasn't created by god is created by engineers”.

Our table saw a polished performance of the Loving Cup Ceremony, resulting from my right-hand guest being an engineer, and eager for data when facing a new situation. She adopted a structured approach and planned, simulated, and executed the task on a right-first-time basis!

Grateful thanks must go to Sandra Watts, our Executive Assistant, who I had the great pleasure of sitting next to, for organising such a magnificent annual Banquet. *Richard Elsy*

THE LORD MAYOR'S SHOW

11 November 2017



WHAT A GREAT DAY OUT!



L to R, The Master, Linda Brooks, Barry Brooks and Janet Groome

The 690th Lord Mayor of London's procession around the City for London was swelled by this Company's own Master, Middle Warden and their Ladies., Past Master Isobel Pollock-Hulf and Liveryman Tony Edwards.

The procession takes a 1.7 mile route starting at the Guildhall and passing by St Paul's Cathedral on its way to Mansion House and returning past St Paul's Cathedral and via the Embankment back to the Guildhall.



Isobel Polluck-Hulf hiding behind an umbrella!

The day's events were finally celebrated with The Lord Mayor's Fireworks in the evening which lit up the River Thames.



EYES RIGHT TONY!



Tony Edwards, Master of the Worshipful Company of Coachmakers and Liveryman of the Worshipful Company of Engineers

CAROL SERVICE AND DINNER

CLOTHMAKER'S HALL *13 December 2017*



The last event of the calendar year in 2017 was the very popular Carol Service at the Chapel Royal of St Peter ad Vincula, which dates from the reign of King Henry VIII. Our Chaplain, The Reverend Peter Hartley conducted the service, assisted by the Chaplain of the Tower, who had commenced proceedings with a brief, but informative, history of the Chapel Royal, which included reference to royal executions and burials under the chapel.



The Master and the Senior, Middle and Junior Wardens outside the Chapel Royal of St Peter ad Vincula

The Choir of St Peter's lived up to their reputation of being one of the finest, as they led us through the familiar festive Carols. Readings were delivered by our Wardens, Master, Master's Lady, in addition to Mrs Sandra Watts, who delivered a reading on behalf of the Clerk's office.

After the Service, we walked the short distance to Clothworkers' Hall for a fine dinner, short speeches and some very entertaining music from The Techtonics, an *a capella* group from Imperial College, London. Their unique blend of seasonal songs delivered with style and humour brought much applause, which was further enhanced by the announcement that many were engineering students at Imperial.

Steve Yiannis



David Swann, the new Clerk who was introduced to the Company at the dinner before taking up his duties on 1st January 2018



The Techtonics, students from Imperial College, London entertaining the Company members and guests

COURT & PARTNERS DINNER

SADDLER'S HALL 9 January 2018



The January Court meeting was held at Saddlers Hall, which also coincided with David Swann's first attendance at a Court Meeting in his new role as Clerk to the Company where he made his declaration and oath..

After the Court Meeting pre-dinner drinks were an opportunity to consider the craft of the saddlers with many tanned hides on display made up into saddles of every configuration.

The dinner afterwards was in the Dining Hall of the Saddlers. The new liverymen and their guests were initiated into the ceremony of the Loving Cup



The Master and David Swann, the new Clerk.



Members of the Court and their partners dining at Saddler's Hall



Ann Vandembroucke and Alan Howell



L to r. Pauline Weston, David Johnson, Terry Weston



Graham Peace and Diana Blair-Fish

ELECTION COURT AND SERVICE AT St. VEDAST-alias-FOSTER

6 March 2018



'Be in charity with all men: fill your heart with a sincere love for all mankind.'
Rule XIII from 'Rules for the Conduct of Life.'



Procession led by the Beadle closely followed by the Master and the Clerk. To St Vedast-alias- Foster

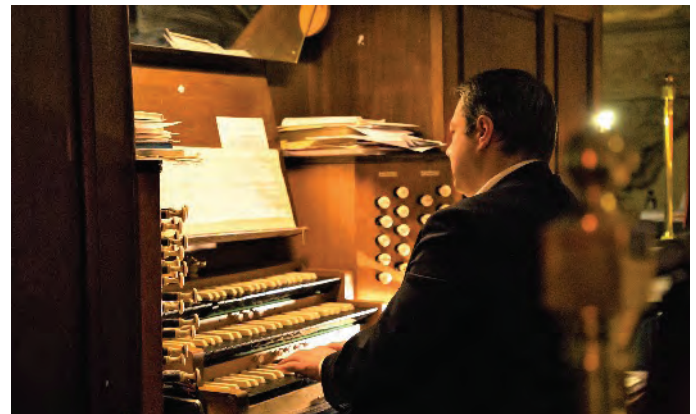
The Court meeting was convened in the Court room of the Ironmongers' Hall. The main purpose of the Court meeting was to elect the new Master for 2018-19, the new Senior Warden, Middle Warden and the new Junior Warden.

The Court received and considered the Annual Accounts for the Engineers' Trust.

The candidate proposed by the Nomination Committee for the post of Junior Warden, Dr Peter Blair-Fish, was elected unopposed. Barry Brooks, was elected as the Senior Warden and Gordon Masterton, was elected as Middle Warden both unopposed. The current Senior Warden, Prof. David Johnson was also elected as the new Master with effect from his installation at Common Hall.

Following the conclusion of the Court's business six new freemen were clothed in the Livery of the Company before the Court, the new liverymen, members of the Company and guests processed to St Vedast-alias-Foster dedicated to a sixth century French Saint.

The service, led by Peter Hartley the Company's Chaplain, was accompanied at the organ by Jo Ramadan. How lucky were we? Jo is an accompanist in demand having performed with Sir Thomas Allan, Amanda Rookcroft and accompanied masterclasses with James Bowman, Michael Chance, Dame Sarah Connolly, David Daniels, Anne Evans, Dame KiriTeKanawa, Robert Tear and many others.



Jo Ramadan at the organ and Director of Music at St Vedast alias Foster

.....AND AFTERWARDS AT DINNER IN IRONMONGERS' HALL !



CITY LIVERY RAF CENTENARY BANQUET

GUILDHALL 20 April 2018



The idea of a City Livery tribute to the Royal Air Force for 100 years of dedicated service was hatched by Tony Edwards, Master of the Worshipful Company of Coachmakers and Harness Makers, Air Pilot and Engineer. The Honourable Company of Air Pilots and the Worshipful Company of Engineers were invited to participate in the planning and collaboration to deliver a tribute worthy of the City Livery and the RAF. The three livery companies stand together as designers, engineers, builders and aviators because they represent the City's and industry's support network for the RAF.



Masters of the Coachmakers and Harness Makers, the Engineers and Air Pilots with their consorts

After more than two years effort the event came to fruition in the Guildhall and its courtyard. An exhibition of iconic aircraft spanning the 100 years plus three engines representing the piston and jet technologies were on display for several days which were visited by thousands of school children and cadets.

The high point of the celebrations was the Banquet held in the Guildhall on 20 April. The guests included the Lord Mayor, Chief of the Air Staff, and over 100 other ranks from the RAF in addition to the guests of the three Livery Companies. A very special guest of honour was Squadron Leader Benny Goodman *Legion d'honneur* who flew with 617 Squadron that sank the *Tirpitz* on 12 November 1944.

All the guests were treated to music provided by the RAF Regiment Band and a wonderful post horn 'conversation' across the hall.

The speeches included original recordings of Sir Winston Churchill, a brilliantly crafted speech by Tony Edwards, and the Lord Mayor who toasted the RAF. Air Chief Marshall Stephen Hillier, KCB CBE DFC ADC MA RAF responded to the toast and proposed a toast to the Livery Companies of the City of London.

The evening concluded with a drill by the RAF's Queen's Colour Squadron display in a twilight where the white team's white gloves shone in the UV lighting, before the RAF's ensign were marched out.

The Engineer's Company formalised its association with the Defence School of Aeronautical Engineering, marked by the presentation of a Scroll by our Master to the Commanding Officer, Group Captain Tone Baker.

Everybody enjoyed themselves but the charitable purpose of the Livery was not forgotten because the RAF Air Cadets will be the beneficiary of a six-figure sum of money raised by the sponsors and guests to which will be added the proceeds of an auction of specially commissioned RAF related aviation art from Jeremy Hunt. The final sum will be known at the conclusion of the auction in July.



Group Captain Baker accepting the framed scroll from the Master Engineer



Birthday Party for the Royal Air Force

Nearly six hundred people arrived at the Guildhall on 20th April to celebrate the 100th birthday of the RAF. And a very good party it was too. It was jointly organised by the livery companies of the Coachmakers, the Air Pilots and the Engineers. On entering the Courtyard of the Guildhall, guests were taken aback to find that it had been converted into an aircraft park with five aircraft and assorted Rolls Royce engines.

The first exhibits were two frail looking biplanes from the First World War, the Sopwith Camel and the SE5a. Seeing these primitive, but very capable machines, brought home to me what astonishing progress had been made in the fifteen years since the Wright brothers' first aeroplane had struggled into the air at Kittyhawk. It is not surprising that the UK authorities recognised the potential and brought the RAF into being.

The next pair of exhibits were the Spitfire and Hurricane to which we are hugely indebted for the freedom we enjoy today. A further twenty years of engineering endeavour had almost tripled the speed of the first world war aircraft and reached the peak of piston engine fighter development.

Finally, I came to today's amazing Typhoon, which is the RAF's state of the art fighter. The aircraft is capable of climbing vertically after take-off and flies

at more than three times the speed of a Spitfire. All this was made possible by the engineering genius of Sir Frank Whittle when he invented the jet engine. How appropriate that his son, Ian, was amongst the guests.

The festivities within the Guildhall started with a reception in the Old Library. This was followed by the banquet in the Great Hall, which never fails to impress with its magnificence and the sense of history that it provides. The guest list was long and varied. Most branches of the RAF were represented. Air Chief Marshalls were sitting down with Senior Aircraftmen. There were also some blue Naval uniforms, but one slightly jealous wearer was heard to remark that 100 years was nothing for the Royal Navy.

The main speeches were delivered by the current Chief of the Air Staff, Air Chief Marshall Sir Stephen Hillier, the Right Honourable the Lord Mayor of the City of London, Alderman Charles Bowman, and the Masters of the three sponsoring livery companies. The speeches were interspersed by recordings of some of Sir Winston Churchill's memorable broadcasts to the nation.

I am sure that everyone went home at the end of the evening with a renewed sense of pride in the RAF and all those who made it possible.

Roger Dunn



COMMON HALL AND INSTALLATION DINNER AT MERCHANT TAYLORS' HALL



24 April 2018

The outgoing Master, Richard Groome referred members to his Annual Report which had been pre-circulated. A full copy of the the Master's Annual Report is reproduced in full below. The Master thanked Isobel, who as Master had handed over to Richard, for her efforts on Promoting Engineering in the City of London (PECL) He informed members that he had been appointed a Vice President of RedR to replace Graham Skinner who has retired. Last but not least he thanked Janet once again for her support during what had been a challenging year.



Richard Groome about to be disrobed as Master

The Annual Report of Eur Ing Richard Groome, Master 2017-2018

‘‘You will already have received the Annual Report and Accounts of the Worshipful Company of Engineers for the year ended 31 December 2017 and the Report from the Trustees of the Engineers Trust, whose funds have now grown to just under £2 million, a remarkable achievement under the new

Chair PM John Baxter. I would just like to add a few personal comments on a year that Janet and I have enjoyed immensely, (albeit it had some challenges), and in which I have been greatly privileged to serve as your Master.

Harold Macmillan was once asked what would blow his government off course....’Events, dear boy, events’ he is reported to have said. Well we have had a few ‘Events’ this year, as I will outline, but it has not blown us off course and we are currently in good health.

We started the year with the aftermath of the Wax Chandlers fire and the move to Ironmongers and Information Technologists. I spent many interesting hours sorting through sooty papers, some of them full of memories, and I am pleased to report that we were able to save most of them, though further sorting is still required.

I have also experienced two Hon. Treasurers and two Clerks this year. I am hugely grateful to Past Master John Banyard who guided us through a very difficult period, and his attention to detail was very important in moving us forward. His role as you know has now been taken by Past Master Pat O’Reilly, who was also a major player in recruiting our new Clerk and was a constant source of advice during the year.

When I took over from Past Master Isobel Pollock-Hulf, our former Clerk was still pretty new in post, and together with Executive Assistant Sandra Watts had done extremely well in stabilising the ship after the fire. The same team delivered an exemplary Awards Dinner in July, in the presence of HRH The Princess Royal. However, as the summer progressed it became apparent that the Clerk was struggling with the role, and she resigned in September for personal reasons. We commenced recruitment again and were delighted to secure Col. David Swann in the role. David has already reintroduced the military rigour to our administration that we enjoyed under Past Master Graham Skinner and Wing Cdr Tony Willenbruch, and he appears to be currently doing very well in his new role. I have to add that throughout the turbulences, Sandra Watts has been a



magnificent stabilizing influence, working hard in somewhat difficult circumstances, and I thank her most fulsomely.

And just a final word about turbulences; we also lost our book keeper in the latter half of last year due to illness, and we lost access to our bank accounts several times mainly because of banking incompetence. I must reassure you all that (a) this was not a typical example of a Master's year (which I have actually enjoyed immensely) and (b) we are in better shape for all of these experiences.

So, in my Installation and Annual Banquet speeches, I spoke about more engagement with young people, STEM initiatives etc., and more influence for the Company in the City of London. It is also the Master's duty to build on the Strategy as outlined by PM Chris Price and PM John Baxter; and to strengthen the Company moving forward. I will leave you to decide how you think this went but it is worth noting that:

- From 1 January we have introduced full management accounts for the first time, through an outside agency, Livery Accounting Services, also based in Ironmongers Hall. We will know, going forward, how the Company and the Trust are doing on a much more accurate basis. This has been a long time coming but we have now achieved it. The driving force behind this has been Master Elect David Johnson, whose contribution to this, our IT system including Web Office and the general workings of the F&GP Committee have been immense.
- Through the enthusiasm of the Immediate Past Master Isobel, we are progressing with a prestigious event later this year promoting engineering to the movers and shakers in the City of London. Of course we are now quartered with one of the Great 12 Livery Companies, with hopefully the rub off influence this could bring. Additionally we held the first of what I hope will be more, low cost technical lectures in the City, which was well attended by a mixture of Company and non Company persons. To this, we owe thanks to the Senior Warden Elect Barry Brooks, who has beavered away at this and

many other initiatives, particularly membership, all year.

- We finally got the new website this year and although it is being added to and developed as we progress, I think it's a much better showcase for us. I'm very grateful to the Junior Warden Elect, Peter Blair-Fish, for his tireless efforts on this (like many others who helped out this year he also had other jobs, particularly as Master's Steward and even Acting Clerk, which he handled seamlessly). Also, with thanks to Dawn Bonfield, we are making first steps with social media.
- We have also started to get younger, non Court representatives, on our Committees, particularly the new Marketing Committee under Court Assistant Richard Nevard.
- Also started, initiatives to include our former Award winners into our fold before they become Fellows, more Freeman initiatives, and at the other end of the scale, better contacts with members' widows or widowers as appropriate; and thanks to the Chaplain Peter Hartley, and the Almoner Barry Gasper, for pushing this. There are some challenges ahead, and our legal eagle Raymond Joyce has been very helpful in trying to avoid the pitfalls. Of course he has also been the new editor of *Swordsman* this year, a role he has taken on with great energy.
- Finally, we have substantially progressed the strengthening of our ties to the Armed Forces, from cadets through to units, and our acknowledgement of their achievements through our awards. We have just taken part in a major STEM initiative with 50 schools and young person's groups attending, to celebrate the centenary of the RAF, an event organized by three Livery Companies of which we were one.
- We are also becoming closer to the Information Technologists, who have a young membership, and lots of potential joint ideas. I should also mention their Beadle Alan, who has assisted at many of our events and has personally arranged to display a lot of our treasures at WCIT's Hall

So, in the Year of Engineering, I think we are moving smartly forward. To return to 'Events', what have I been able to attend or facilitate? Well Janet



and I have attended over 130 events as diverse as the World Lego Robot Championships and the Trial of the Pyx, and hopefully, made more people aware of the Engineers Livery Company. *Inter alia*, we were able to return to Ironbridge in their 50th year as an engineering attraction, and my favourite manufacturing site of all, Rolls Royce Aero Engines.

We held a joint event with the Welsh Livery, organized by a Liveryman in both camps, Windsor Coles, which was a great success. Court Assistant Audrey Canning organized no less than three engineering themed walks during my year, (good for the body and brain combined) and Court Assistant Penny Taylor ran her popular West Midlands social event once again; both these ladies deserve special mention. We had a full programme of our own events, and I thank the Middle Warden Elect Gordon Masterton for his experienced hand as Chair of the Programmes Committee, and our Beadle Peter Thompson for his professional leadership during our functions, now sporting his new Beadles Hat, which I commissioned for the Company. I must also thank John Canning for standing in as Company photographer on numerous occasions.

We also continued to fulfil our considerable charitable aims and objectives through the Trust, with our well regarded awards and bursaries, including the prestigious MacRobert Award, and our continued support for RedR. On that note I need to mention the many years of work put in by Past Master Graham Skinner, as a Vice President of RedR, a role that he will shortly be retiring from. In terms of Engineering in action, in some of the worst places on earth, it would be difficult to name a more targeted charity.

As Isobel remarked before me, and I also said in my Installation speech, you stand on the shoulders of giants when you take on this role, and I refer of course to the Past Masters who have been a fantastic support to me. It's completely true what many of them have said, that despite all the preparation, you don't really get to know how to be Master until you have nearly finished your year; and just as you are getting good at it, you have to pass over the reins. Well que sera. At least with the publishing this year of Gordon Masterton's Haynes Manual on how this

Company works, we are hopefully passing on more information than ever before.

Of course the other giant's shoulders I have used and probably somewhat imposed upon this year have been Janet's. She has thrown herself into the Consort's role with gusto and been a major support throughout the year; I could not have done it without her.

So finally, as only your second Chemical Engineer to be Master, (shame) thank you all for your support and I hope you enjoyed the year as much as we did. We pass the steering wheel to David and Marilyn now, and hope to support them as Past Master and Mistress as much as they have supported us."



A disrobed Immediate Past Master and a fully robed Master each congratulating the other!

The acceptance speech of the Master 2018-2019

"Wardens, Past Masters, Court Assistants, Liverymen and Guests.

I am honoured to have been installed as the 35th Master of the Worshipful Company of Engineers. And amazed – I haven't had a high profile career and have steadfastly stayed in the virtual laboratory. Indeed - one of our Liverymen referred to me as a 'Boffin from Derby' in his clothing speech a few years ago.

So, I should like to thank you ALL for your confidence in installing me as your new Master.



As some of you will know – my years as middle and senior warden have involved duties that don't normally go with the post. But I've learned a great deal about the workings of the Company over the last year, in particular I'm very grateful to those who have helped me along the way. In particular I have been very grateful for the support of a number of past Masters who have guided me. But I'm sure that I will still only know what I needed to know when I get to the end of my year.

So - I was most relieved when we recruited Colonel David Swann as Clerk at the beginning of the year. David has been hugely supportive over the last few months as we pulled this coming year together. I thank you – David - for yours and Sandra's support and look forward to it continuing. It's customary at this point to say a little bit about plans for the next year.

Over the last nine years we have seen significant modernisation of the Company - starting with Past Master Chris Price's strategy 25 Plus, Past Master John Baxter's strategy 30 to 100 and - most recently – Past Masters' Pat O'Reilly, Isobel Pollock-Hulf and Richard Groome's delivery of these. I believe that they have largely achieved the objectives we set out – and embedded them in the way we now run the Company. Thanks to all of you for a much needed sense check on where the Company was going and the steer you gave it.

So I am pleased to announce that – even though there is a 5 in 35 – I have absolutely no intention of generating another strategy in my year. I'm keen that we should catch our breath and enjoy a year of Friendship and Fraternity – and don't take that lightly - it's probably the first time in my career that I've proposed holding back. But that doesn't mean resting on our laurels - our mission continues to broaden our membership base, to attract younger members and to better support partners of departed colleagues. We aim to introduce grades of membership that will be attractive and affordable to young aspiring engineers who are likely to become our liverymen of the future and to remain in contact with those partners of past members who have supported the Company and deserve more than we presently give them.

We will also build up our technical raison d'être - not in the least to develop our learned society role that keeps the VAT man away from your quarterage. Perhaps one of the benefits of my lack of progression through corporate leadership is that I have remained at the forefront of technological change and – in particular – the introduction of computers into engineering. That change is now happening faster than ever before as digital technologies invade and change all of the traditional engineering disciplines.

So my theme for the year is 'Digital Engineering'. By choosing this theme I hope to expose our members to an aspect of engineering that they may not be familiar with – a label they may have heard of but perhaps have little idea of what it really is and how it works. A modern side of engineering that attracts young people - irrespective of gender, ethnicity, or disability that will probably address current perceived imbalances without us having to forcibly tip it. This engineering is innovative and disruptive - and it is the future.

In this context I should also like to briefly mention the Engineers Trust from which I will stand down on Thursday after my six year term as a founder Trustee – only to take up the position of ex-Officio Trustee as Master. The Trust is now more active in its awards and funding than ever before – thanks mainly to members' generosity. It continues to focus on younger engineers and engineering excellence. The Trust's new strategy recognises that digital engineering will change where it might focus. You will all be aware of Weboffice – I guess. The webpage you use to make your event bookings is the 'customer facing' part of a system which now provides the backbone of administering our members and events. There is increasing interest from other Livery Companies in this system and I am delighted that the Plumbers' Company has adopted it also and will be paying its licence fee into the Trust. My hope is that the income derived from licencing Weboffice to other Livery Companies can be used to support an annual 'Digital Engineering Award' once we have a sustainable level of income. The year will - of course – have a selection of activities and visits. I have been encouraged to focus



on quality not quantity and start the year with that very much in mind. Livery is not a cheap pastime and I am acutely aware that our program needs to be attractive to those who are still in their relatively early careers. I have added a 'Master's Lecture' to the technical program that I hope will endure beyond my year continuing our series of 'low cost lectures' and which will cover a technical subject of the Master's choice. This year I shall personally deliver this - covering digital engineering as the topic.

But I am also a railway engineer and the year wouldn't be complete without some railway content - although with a significant technology component. A focus on the railway of the future which will be very different to that which we have engineered in the past.

We have a good year planned. A number of technical visits - an Out-Of-Town to the Peak District and - of course - our regular social and Livery programme. A few changes of detail such as adapting the lessons learned from the Trust's last two Awards ceremonies into a more affordable format. Evolution, not revolution.

This time next year I look forward to looking back on a year of consolidation and one where we have increased our technical understanding of how engineering will be moving in the future
Past Master Richard - you've steered us through a challenging year which has provided a full social calendar, a range of first class technical visits and some great memories. You and Janet have had a full year representing the Company amongst others. You have both been considered by your peers to have been real ambassadors of the Company and really nice people with it. It will be a hard act to follow. Thank you so much from all of us for your contribution to the Company - it's been a pleasure being part of your team."

With that, I now invite our new Immediate Past Master to be clothed in his Past Master's Gown and receive his Past Master's Badge and Certificate.

Other business during Common Hall included Barry Brooks and Gordon Masterton being installed as the Senior Warden and Middle Warden respectively and

Peter Blair-Fish being installed as the Junior Warden.



Peter Blair-Fish receiving the badge of Junior Warden from the Master

John Baxter, Chairman of the Engineer's Trust presented his report on the Trust and The Master, David Johnson, was presented with his certificate of fellowship of the IET by its current president, Nick Winser CBE.

And so another past year had been summarised and the coming year had been planned, all done seamlessly thus preserving the tradition of the Company.

—o0o—

After Common Hall the guests including Masters from various Companies and the family of the new Master enjoyed pre-dinner drinks in the courtyard of Merchant Taylors' Hall.

After dinner the guests had the pleasure of an entertaining speech from an 'oily rag' engineer, Adrian Shooter CBE FREng, explaining how stripping down a motor bike was the first step on a path to become a successful railway entrepreneur!



The new team for 2018-2019!



Above- Dinner in the Banqueting Hall of the Merchant Taylors' Hall .

Top right - Major Gen. Tyrone Urch CBE, Yuli Doulala-Rigby and the Chaplain, Peter Hartley

Guests enjoying the weather for a pre-dinner drink in the courtyard of Merchant Taylors' Hall



PARTNER'S VISIT TO THE BANQUETING HOUSE AND THE FARMER'S CLUB

4 October 2017



The Master's Lady, Janet Groome, arranged a fascinating visit to The Banqueting House followed by a delightful lunch at The Farmers' Club.

We were greeted at The Banqueting House by our guide, Sandy Rhodes, who gave us an interesting insight into the building's long history. Built by Inigo Jones for James I from 1619, it is the only part of Whitehall Palace to survive a fire in 1698. Two previous Banqueting Houses had stood on the site.



Waiting outside the Banqueting House

Jones began the fashion for classical style architecture very much influenced by Palladio, which set the style for public buildings for the following 250 years.

The Banqueting House is like a basilica supporting a chamber of double cube proportions. The first Court Masque was performed here in 1622. The masque was more than a play but rather a political statement emphasising the positive effects of kingly rule. Inigo Jones was called upon to create elaborate sets for the masques.

The painted ceiling was added by order of Charles I in 1636, employing Peter Paul Rubens to carry out the work. The nine panels were more than a memorial to James I, they emphasised the role of the monarch in providing peace through stability by portraying James as a great leader bringing peace to the Kingdom with the aid of classical deities. It is a statement of belief in the Divine Right of Kings. Ironically, this is one of the last sights that met Charles I as he stepped through a window of The Banqueting House onto a platform erected for his execution.

Christine O'Reilly





Visit to Crossrail by the Mistress Engineer and Consorts

12 April 2018

The Mistress Engineer, Janet Groome, hosted a visit to Crossrail, Whitechapel, for a group of Livery Consorts, on 12th April. The Chairman of Crossrail, Sir Terry Morgan, gave a short presentation on the project and then took the party round the site, which is complex and tight on space, with three rail interfaces (Overground, Underground and Crossrail (The Elizabeth Line)) all in one station.

The Livery Consorts learnt that a fleet of 70 new 200 metre long trains built in the United Kingdom will run on the Elizabeth line, featuring nine fully-interconnected walk-through carriages, air conditioning, CCTV and real-time travel information. Each train will be able to carry up to 1,500 people.



The Livery Consorts were amazed at the 200m long platforms and the efficient step free and other accesses to get passengers away from the trains smoothly. They were particularly impressed that each station has an architectural artwork theme, and Whitechapel's is a sound wave symbolising Bow Bells.

Crossrail has created over 1000 apprenticeships, many of them local, and almost a third of Crossrail Ltd jobs, are filled by women, compared to just 20% of job roles across the UK construction industry.

Brooch Lunch

25 April 2018

The Brooch Lunch took place in the Alderman's Dining Hall in the Guildhall with 19 ladies present. Once we were all seated, Janet Groome, Immediate Past Mistress, rose to tell us how much she had enjoyed her year as Mistress Engineer both within the Company and at other Livery events. She recalled highlights of her year. Janet then turned to Dr Marilyn Wedgwood-Johnson and passed on the Mistress' brooch fastening it as a pendant and wishing Marilyn a good year.



Janet Groome congratulating Marilyn Wedgwood-Johnson

Marilyn then thanked Janet for an enjoyable year and outlined some events in the coming year. She also mentioned City Consorts which is a group set up for Past, Present and Future Consorts to help them get to know others in the same position, especially Future Consorts, and with information about how the City and the Liveries function. Marilyn then passed on the Past Mistresses badge to Janet.

We were then treated to a wonderful three course meal in a room filled with much talk and laughter. At the end we toasted the Queen and the Engineers but talk flowed on. During the latter stages the Master appeared and later we were able to thank the chef personally.

Linda Brooks

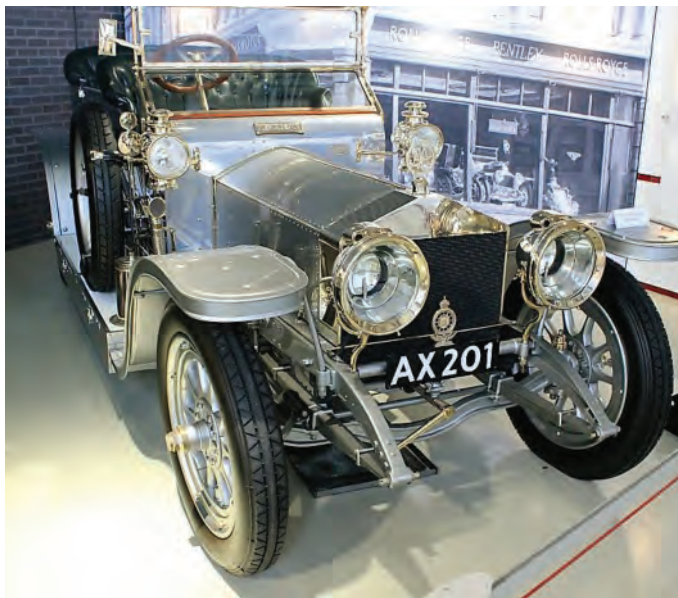
VISIT TO ROLLS ROYCE PLC - DERBY

14 March 2018

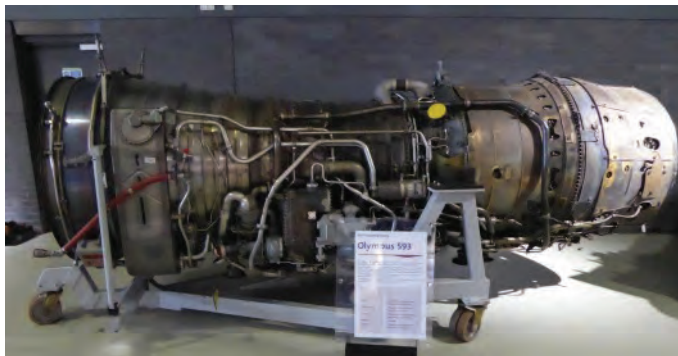


A large party of 45 members of the Company and their guests arrived at the Rolls Royce Learning and Development Centre at Rolls Royce (RR) in Derby for what was a fascinating visit: hosted by Simon Burr, Director of Engineering and Technology, Civil and Aerospace. In four groups we each visited the following areas.

The Heritage exhibition starts with the first meeting between the Hon Charles Stewart Rolls and Frederick Henry Royce in May 1904 and the formation of Rolls Royce Ltd in 1906. The 1907 Rolls Royce Silver Ghost that was on display



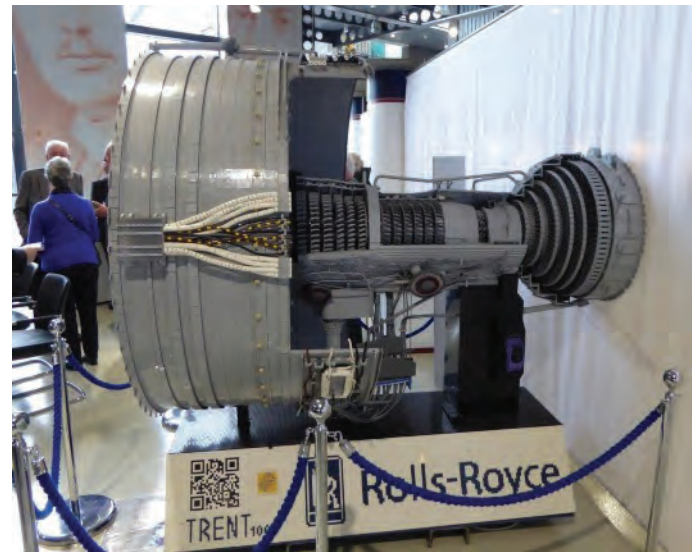
won awards for faultless performance in reliability trials. Based on innovation, outstanding engineering design and meticulous attention to detail and quality the RR concept of never ending development was born.



Four Olympus 593 jet engines were used to propel Concorde to a speed in excess of Mach2.

Rolls was passionate about powered flight and made the first two-way non-stop flight across the channel. Tragically, he also became the first UK aviation fatality when in 1910 the tailpiece of his Wright biplane failed in flight. Prior to that he had been encouraging Royce to produce an engine for powered flight that eventually led to the series of 'birds of prey' engines (Eagle, Kestrel, Merlin, Griffon, etc.) and unparalleled success for RR in the civil and military aviation fields. Using two Eagle engines the Vickers Vimy had made the first non-stop transatlantic flight in 1919, thus demonstrating that intercontinental travel by plane was possible. RR also powered the planes that won the Schneider Trophy and the Merlin, Griffon and Meteor engines that were crucial in the Second World War.

Collaboration with Whittle on jet development led to engines with river names (Derwent, Avon, Spey, Trent, etc.)



A view of the Trent engine

The Olympus engine used in Concorde and the RB 211 family of 3 shaft, high bypass, turbofan engine that first powered the Lockheed Tristar were on display. The final part of the exhibition described current strengths including the BR 710 engine for corporate jets, diesel engines and power units for Trident submarines.

The Technology exhibition featured less familiar interests of RR including permanent magnet marine thrusters, quiet marine hybrid drive systems with



electric, diesel or gas turbine engines, waterjet propulsion systems, large unmanned civil ships and use of ‘big data’ in real time for optimising engine performance and to spot potential operating problems. Information from RR engines being used by customers around the world arrives in real time at Derby for analysis, interpretation and pre-emptive action.

RR also manufactures the Small Modular Reactor (SMR) nuclear power plants for military and civil applications, engines for the Short Take Off and Vertical Landing (STOVL) stealth fighters and is pioneering 3D printing for manufacturing aero components using the Additive Layer Manufacturing (ALM) technique in which 2D powder layers are used to make 3D components via selective melting. The MT30 gas turbine engine is used in the US Navy’s multi mission destroyers. Much of the Technology exhibition is concerned with the design and manufacture of the large turbofan engines on wide bodied planes that carry so many of us around the world.

The Apprentice Academy provides the training supply chain for RR’s main workforce. After a competitive selection process the successful apprentices (average age 18½) receive off job training in many different skills in various centres and colleges. The Academy has classroom based instruction, training rigs and a machine shop: there are hands-on facilities for up to 150 staff per day from customers for baseline maintenance training (such as use of inspection boroscopes and on-wing care, total care package).

All new graduate recruits undertake the 16 week ‘Design & Make’ training during which they are required to investigate and solve a real problem whilst liaising with the customer.

98% of apprentices successfully complete their training and all of these are offered jobs with RR. Many progress to senior roles within the organisation and 20% of current senior managers in the UK started their careers as RR apprentices. The company plans to recruit 377 apprentices next year with a target of 20% females and essentially the same ethnic mix as in the current workforce. As part

of its STEM initiative RR visits schools, clubs and societies such as scouts and girl guides with the goal of interacting with 6 million young people.

The build flow line for the new 6th generation Trent XWB (Extra Wide Body) engine as used on the Airbus A 350 family and the Boeing Dreamliner: this is the world’s most efficient large aero engine with a share of over 50% of the world’s wide-body engine sales. Almost 300 of the latest engines have already been sold and a further 1600 are on order.



Some of Company’s party standing in front of the Trent XWB.

The engine assembly by highly skilled teams is manually intensive. At the end of the build there is a 6 to 8 hour test for every engine.

Where does the future lie for RR? We learnt how it aims to be the fast, agile, leading industrial technology company who deliver system level solutions rather than individual products. Its investment in electrification, carbon free energy and digital technology is all part of that picture.

We must express our sincere thanks to the many individuals who made presentations to us all, the individual guides for each group and to RR for its hospitality. And an especial ‘thank you’ for Professor Ric Parker for arranging the visit.

Simon Waldram

WHITHER OUR PEI's?

THE UFF PERSPECTIVE *15 October 2017*



For the first of a new style of the Company's early-evening lecture-seminars, Liveryman Professor John Uff CBE QC FEng generously hosted 42 Liverymen and guests at Keating Chambers, on 15 November 2017 when he summarised his review "UK Engineering 2016" commissioned by ICE, IET and IMechE.

The report

(<https://www.raeng.org.uk/publications/other/uk-engineering-2016>) addresses concerns that:

- 1) there are too many Professional Engineering Institutions (PEIs) and that they are not sufficiently engaged with the engineering profession
- 2) leadership of the engineering profession is fragmented and ineffective
- 3) there is no reliable data as to UK's requirement for more skilled engineers
- 4) promotion of engineers and engineering is ineffective.

He noted that there are 35 PEIs with historical divisions between them which are outdated and that their membership amounts to a small proportion of the roughly four million people in engineering work in the UK.

Presently, only 20% of schoolchildren in the UK study mathematics after GCSE, which is very much less than in other countries. The courses offered to them by universities are constrained by the specialisms of the PEIs with few universities offering multi-disciplinary engineering courses. On a more positive note, degree apprenticeships are now being offered which combine work experience and study without accompanying debt.

His review recommends a joint body to promote mergers of PEI activities leading to a situation where members of any PEI could access the facilities of others. He also recommended that the grades below CEng be combined into a single grade of "Registered Engineer" and that registration be

offered to the wider engineering community at modest cost.

He recommended changes to the work of three bodies: the Engineering Council, which oversees professional standards; EngineeringUK, which promotes engineering to the profession and the public; and the Royal Academy of Engineering, which represents the profession to government. He recommends that the activities of EngineeringUK be merged with the promotional work of the Royal Academy of Engineering.

John Uff's presentation was followed by a lively Q&A, including contributions from senior figures from several PEIs. In view of the Chatham House Rule, such comments were off the record. Nonetheless, there was a general view that the findings of John's Review warranted action beyond that of the commissioning PEIs and Liverymen were invited to engage with their PEIs to see what is happening.

At the end of the evening the Master presented John with a Stirling Engine to commemorate the event, debate continued over light refreshments kindly provided by John's Chambers.



Donations from delegates generated £315 for the Engineers Trust.

Colin Newsome

RASPBERRY Pi - WINNER

MacROBERT AWARD 2017 14 November 2017



The team behind the MacRobert Award-winning Raspberry Pi pocket-sized microcomputers shared their incredible success story at an event at the Royal Academy of Engineering in November, revealing how these led to a coding revolution with a myriad of unexpected business benefits.

Speaking in conversation with science journalist Dr Anjana Ahuja, Raspberry Pi co-founders CEO Dr Eben Upton and Pete Lomas explained how the success of Raspberry Pi has spread far beyond the classroom, an achievement that was recognised when the team were awarded the 2017 MacRobert Award for UK innovation in engineering.



Pete Lomas (right) and Eben Upton CEO (left)

The organisation has sold 16 million units since the first Raspberry Pi was launched in 2012. From initially setting out to help increase the number of computer science applicants to the University of Cambridge, the Raspberry Pi team has put the power of computing into the hands of people all over the world. The team's work has also resulted in an intelligent, programmable controller that has found applications in many different industries. "...people are building businesses on the back of the Raspberry Pi," says Dr Upton.

They also explained the unique challenges of running Raspberry Pi as a not-for-profit organisation. Millions of pounds worth of profit generated by the commercial arm supports the charitable arm Raspberry Pi Foundation to help teach computing to hundreds of thousands of young

people. Through initiatives across the UK, Raspberry Pi helps 85,000 children in 5,750 weekly Code Clubs learn the basics of coding. This reach is not limited to the UK; there are another 4,500 Code Clubs worldwide, teaching basic computing skills in 27 languages through 1,084 Raspberry Pi Certified Educators.

"It was the sheer quality of the innovation that set the Raspberry Pi apart from other candidates for the 2017 MacRobert Award," says Dame Sue Ion, Chair of the MacRobert Award judging panel. "By blending old and new technology with innovative systems engineering and circuit board design, the team has created a computer that is cheap, robust, small and versatile".

The MacRobert Award, first presented in 1969, is the UK's longest-running and most prestigious national prize for engineering innovation, worth £50,000 to the winner. Originally founded by the MacRobert Trust, the Award is now presented and run by the Academy, with financial and technical support from the Worshipful Company of Engineers including Past Master John Baxter and Court Assistant Professor Ric Parker as judges.



Hayaatun Sillem (New Academy CEO 1.1.2018), Senior Warden David Johnson and, Past Master John Robinson

John Baxter

Readers may wish to note that there is a planned visit to the factory of Raspberry Pi on 3 July at Sony, Pencoed, Wales and that the winner of the 2018 Award will be announced at the RAEng Awards dinner on 27 June.

GLYNDEBOURNE OPERA VISIT

5 October 2017



It was one of those last murmurs of summer when the sky is cloudless and the warmth of the sun is extinguished by the breeze rustling the autumnal leaves. It was a perfect October day and set the scene for a perfect day at Glyndebourne.

Before we gathered for lunch there was ample opportunity to explore Glyndebourne's grounds and visit the organ room in the old house. As the sun streamed in through the long drop windows over lunch there was a genuine buzz of anticipation for what was in store. Tom Harrison, Glyndebourne's production manager, entertained and informed us with his account of how he became smitten with opera at the age of 14 years old. After a BA in English and drama he went to RADA which was his professional training to step up to the first rung of producing professional theatre. He explained how his role was essentially one of logistics to ensure that the production would be transported to each of the theatre venues and fit on the stage and the cast need to be comfortable with the new space.

characters were well defined. If the audiences around the country who will have seen this production were half as cheered as we were, it will have been a success.

Our satisfaction at such a brilliant day out was further gilded by learning that we had raised over



From one end of the organ room at Glyndebourne - to the other!

The challenges faced by Tom are made much easier by the collegiate spirit of all those involved in the touring productions which is the opportunity for the younger teams of technicians, artistes and conductors to gain valuable experience.

We had been allocated seats that meant we had an uninterrupted view of the stage as we waited for the dress rehearsal of the Barber of Seville, by Rossini, to commence. It may have been a dress rehearsal but the performance was to all intents and purposes, flawless. It was colourful, witty and each of the

£4500 for the New Generation Programme which is an educational trust to support technicians and artistes in the theatre.



RAMBLING REPORTS

Abbey Wood, Charlton House and the Thames Barrier 24 March 2018



After assembling at Abbey Wood station, for the 7th Livery walk our first destination was the restored walls of Lesnes Abbey, belonging to the order of Augustinian monks. Founded in 1178 by Richard de Luci, Chief Justiciar of England (authority second only to the King), the abbey was dedicated to St Mary and St Thomas the martyr. It is speculated that Richard built the Abbey as penance for his involvement in the death of Thomas Beckett in 1170.

The walls of the abbey are built of Kentish ragstone, with some embellishments of stone from Caen like most of the stone used to build the White Tower in the Tower of London. However, maintenance of the extensive buildings suffered from chronic financial difficulties and the Abbey was closed by Cardinal Wolsey in 1525, under a license to suppress monasteries of less than seven monks.

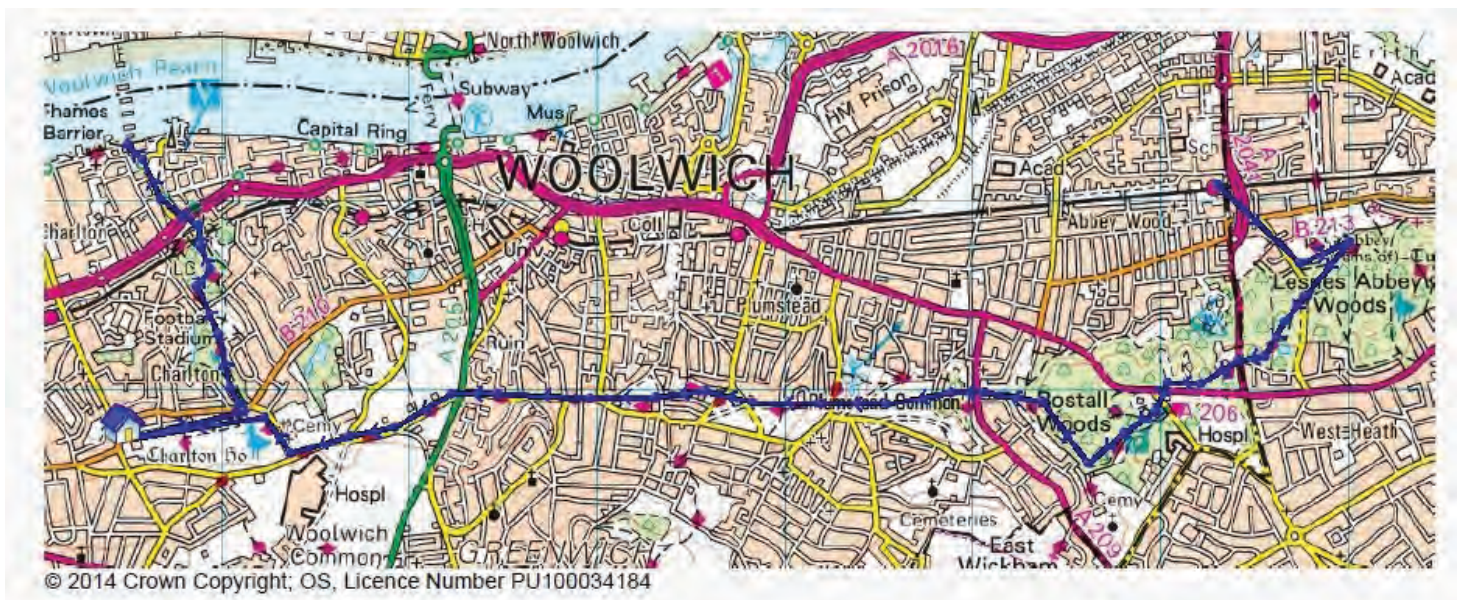
Following a very pleasant walk through the surrounding Abbey Wood, and hosts of wild daffodils (shades of William Wordsworth) we arrived at the 55 million year old fossil site, where numerous bivalve and gastropod shells were found by our eagle eyed walkers - not to mention the plastic remains of the efforts a prior junior fossil hunter. Entry to Abbey Wood is protected by a magnificent wooden carving of a Coryphodon, a pre-historic ancestor of the wild boar - one of the earliest mammalian inhabitants of the area. Sadly

the much prized sharks' teeth and mammal bones that are sometimes found eluded us completely, although we were later presented with 'souvenirs' by our guide from the London Geodiversity Partnership, Diana Clements.

www.londongeopartnership.org.uk

Diana explained that the shell beds came to be so high above sea level when the tectonic shifts that created the Alps produced the topographical "wrinkle" that is the London basin. We also learned that ice age glaciers stopped on the north side of the basin, and so like so many present day taxi drivers, were unwilling to venture south of the river!

From the shell beds we had a steep ascent through woodland to Bostall Heath, followed by a steep descent to cross the Wickham Valley, now dry. We climbed again to Bleak Hill and Winn's Common then down again to the Slade Ravine with a natural pond fed by a stream, recently cleaned and given a weir system and reed bed filter. From Plumstead Common we followed the road, passing Puddingstone Grange, named for the characteristic "dogstone" conglomerate lumps of the area incorporating Blackheath gravel. Leaving to our left the heights of Shooters Hill, formed by London clay capped by sand and gravel, we crossed the South Circular Road. In Cemetery Lane we were reminded to study the local bricks with yellow colour and charred remains of ashes added to aid firing.



RAMBLING REPORTS

The Greenchain Walk: London Geology, Abbey Wood and Thames Barrier 24 March 2018



Arriving at Charlton House, the best-preserved Jacobean House in Greater London considered by some to be one of the best in the country, we were treated to a very fine buffet lunch in the Tudor Long Gallery. Built in 1607 for the oldest son of James I, and representing an architectural era of less than 20 years, it links the sprawling style of the Tudor age with the compact geometry of Inigo Jones. The original oak staircase remain, as do many fireplaces and plasterwork ceilings. Charlton House has a rich (and sometimes bawdy) history, including once being owned by the wife of Spencer Perceval, the only Prime Minister to be assassinated in the House of Commons!

After lunch we were treated to two lectures. Diana gave us an overview of the varied geology below London, from the chalk of 84 million years ago, through the marine Thanet Sand and the Upnor, Reading and Woolwich Beds to the black pebbles of the Blackheath Beds, which we had seen along our

route. All this is below the London Clay and Bagshot Gravels. Our 2nd lecture was presented by Mr Adrian Franklin the then Costain Project Manager for the barrier construction. Adrian brought with him a self-made working model of the revolving barrier gates which was of great help in understanding the revolving segment concept of water control.

The Barrier was opened in 1984, some 30 years after the disastrous 1953 floods that killed 300 people in London. Both speakers confirmed that the site was selected due to its suitable bed rock geology. Nine piers were put in place with coffer dams and keyed into bed rock before the six 11,000 ton 'sills' were floated out and put into place between them, to provide a seal to the river bed and avoid erosion. This operation required tricky manoeuvring of supply vessels and extremely accurate surveying between shore and river, all completed before laser technology was available to 'within +/- 5mm. At its peak, Costain employed some 2000 staff, including 250 divers for under-water work. Negotiations with Unions, the Port of London Authority, plans for a hydrofoil service to France and the bomb squad for disposal of WW2 bombs all increased the project management challenges when finalising the 7,000m³ of under-water concrete pours. In response to questions, it was noted that, although built for a 40 year lifetime, the design life is now estimated to be good to 2070. The Barrier is typically used 6 times/yr although in 2014 it was used 20 times due to heavy rain and storm surges, a consequence of rising sea levels and the slow sinkage of eastern England.





On reaching the Thames we were relieved to hear that the underlying chalk reaches the surface at this point and provides a firm foundation for the all the Barrier structures!

Despite being one of our more physically demanding walks, the unusual location, the geology lessons, the novel lunch venue, the glimpse of the Thames Barrier and even the journey home (surrounded by half of London travelling back from their many football and rugby matches), were generally agreed to be a stimulating experience, well worth the effort.

Audrey Canning, Christopher Morgan, Susan Shillito, Tony Whitehead

Following lunch we completed our walk to the Barrier, with a final climb to Cox's mount to be rewarded with a splendid view of the lower Thames, as well as to view 'in-situ' the geological strata. Gilbert's pit, a former quarry last worked in 1938 (and now a site of special scientific interest), provides an excellent illustration of how the Blackheath pebble beds overlay the Thanet sands.



COMPANY NEWS



A ‘thank you’ from Immediate Past Master Richard Groome

My year has rushed past; a blur of events, speeches, advancing our cause, and hopefully generating fun and interest for our members. My Annual Report at the AGM detailed this in more detail, but I would just like to add a couple more comments.

One of my themes for the year was to encourage and enthuse young budding engineers, and we saw no better an initiative in the last few weeks than the Centenary of the RAF weekend at the Guildhall in April. Organised by myself, the Master Coachmaker Tony Edwards (also one of us), the Master Air Pilots Colin Cox, and lots of helpers; this had been a year in the planning and had various hurdles along the way. However for four days we had five full size aircraft and three engines on the Guildhall yard, with supporting exhibitions and STEM ambassadors; a City Reception attended by 900 RAF personnel and supporters, and an amazing banquet on the Friday night attended by the Lord mayor and 550 guests.

At the Banquet, I presented the Commandant of the Defence School of Aeronautical Engineering with an Affiliation Scroll, which extends and revitalises our previous relationship with RAF Cosford. But the most important were the 100's of Air Cadets and schoolchildren who swarmed over the exhibits on the Saturday and Sunday, and as the Chief of the Air Staff has since written to me, '*...for RAF 100 - an excellent launch platform, we believe, for inspiring the next generation towards STEM subjects and towards realising their great potential*'.

I also noted the state of apprenticeships in the UK in my Annual Banquet speech last October, saying that we all had a duty to increase good quality positions within our companies. I was therefore delighted to attend the Whitechapel site of Crossrail recently, on a visit organised by my wife, and hosted throughout by our Liveryman Sir Terry Morgan. As you may have picked up from the report in this edition of the Swordsman, Crossrail has created a staggering 1000+ good quality apprenticeships and also employs way above the female engineer numbers for

the construction industry. So we are making progress in some areas!

Thank you once again, from Janet and me, for the privilege and honour of being your Master and Mistress, and we hope to support the Company further as it moves forward.

Richard Groome

News from Court

The new Clerk, Colonel David Swann CBE started his duties on 1 January 2018.

The Company was one of three Livery Companies to host the City Livery Centenary Tribute to the Royal Air Force, see page 10. Air Marshall Julian Young made a public declaration to be admitted to the Freedom of the Company in the Guildhall Courtyard during the City Livery Centenary Tribute to the Royal Air Force.



The Court has approved a ‘Workshop’ Manual that has all the information a member could possibly want to know about the Company which will be distributed by email to all members!

Companions and Associates

The Court has responded to a request from the Almoner and recommended the creation of a Companion grade for widows or widowers of current members of the Company.

The Court has also recommended a new grade of Associate for some of the Company’s Award and Bursary winners who would be invited by the Court to be Associates. The details of how this new way of connecting to appropriate people interested in and of benefit to the Company are being refined and will require a Special Resolution to formalise later this year. The Court has recommended the creation of a grade for widows of spouses who pass away while members of the Company. They will be referred to as ‘Companions’ after the necessary resolution has been published to the membership for approval.



The Court has also recommended a new grade of Associate for winners of the Company's Awards and Bursaries who are invited by the Court to be Associates.

Armed Forces Affiliations

The Company has strengthened its affiliation with the armed forces including;

- a formal affiliation with HMS ANSON, one of the new Astute class of nuclear submarines that is being built at Barrow in Furnace. A Technical visit to the submarine and to meet the ship's company takes place in mid-June;
- an association with HMS PRINCE OF WALES, the second of the two new aircraft carriers. This new relationship is being established through the Company and the Institute of Marine Engineering Science and Technology (IMarEST) jointly sponsoring two annual prizes – one for Operational Engineering for a member of the Marine Engineering Department, and a second to commemorate Vice Admiral Wildish with a prize for engineering innovation, to be awarded to someone from any engineering department (Air, Marine or Weapons). Senior Warden Barry Brooks will represent IMarEST and the Company at the first presentation at HM Naval Base Rosyth in mid-May.
- Our existing affiliation with RAF Cosford has been revitalised with a broader connection to the Defence School of Aeronautical Engineering at RAF Cosford.
- Although not part of the armed forces, the Company is developing a relationship with the cadet forces to provide 'carpet guards' at some of our major events, eg Sea Cadets at the April Installation dinner; Air Cadets at the July Awards dinner, and Army Cadets at the Mansion House dinner.

Growing the Company

The Court agreed, over two years ago, to increase the number of Liverymen from around 300 to our approved limit of 350, and to increase the number of Freemen to 50, and possibly up to 100. Despite considerable efforts, including encouraging the professional engineering institutions to draw their new Fellows' attention of the opportunity to join the Company, our numbers are still around 310 Liverymen and 12 or so Freemen.

While we all acknowledge that most new members come through personal contact if everyone of our 322 members invited one person to consider joining the Company, and 1 in 10 did actually join, we would achieve our 350 Liveryman target and have a growing list of Freemen too.

The message is, please bear this request for help in mind when you meet other engineers, particularly working engineers, explain the benefits of joining the Company and invite them to come along to an event. Through the Clerk, the Membership and Marketing Committees can help you with the appropriate "messages".

Engineers Trust/IET Horizon Engineering Bursaries

Wanted!

The Engineers Trust is urgently seeking Liverymen or Freemen to act as Mentors for three of this year's five Horizon Bursary winners. The bursary winners are already announced and looking forward to the mentoring element of the Engineers Trust Award.



NEW ARRIVALS

Welcome to our new liverymen



Welcome to six new liverymen clothed at the Court Meeting on 10 October 2017.

David Cardwell

BSc MA PhD ScD honorary DSc CEng CPhys FEng
FIET FInstP



David Cardwell studied Physics at the University of Warwick between 1980 and 1986. He joined Plessey Research (Caswell) on completing his PhD, and prior to moving to Cambridge in 1992. He is Professor of Superconducting Engineering and Head of the Department of Engineering, University of Cambridge, where he leads the Bulk Superconductivity Research Group on the processing and applications of bulk high temperature superconductors, which can be used to generate very high magnetic fields, including the world record field on 17.6 T in a bulk superconductor set in 2014. He has authored over 350 technical papers and patents and has given invited presentations at over 60 international conferences.

Professor Cardwell was elected to a Fellowship of the Royal Academy of Engineering in 2012 in recognition of his contribution to the development of superconducting materials for engineering applications. He was awarded a Sc.D. by the University of Cambridge in 2014 and an honorary D.Sc. by the University of Warwick in 2015. Professor Cardwell has been a Fellow of Fitzwilliam College since 1993.

He is a passionate football fan, having supported Derby County all his life and enjoys SCUBA diving in seas considerably warmer than those around the UK.

Graham Barton

MA MEng CEng FICHEM E



A gap year making bangs and smells at the Kodak research labs in Harrow set Graham on course to a degree in Chemical Engineering at Cambridge. On graduating, Graham joined Humphreys & Glasgow as a process engineer on the detailed design and commissioning of the BP Miller platform, and suddenly feels very old on seeing that platform removed from the North Sea this year.

There followed a thirty year career in various upstream oil and gas engineering and project management roles with Shell, Tullow Oil and New Age encompassing projects as far afield as Oman, Egypt, Kazakhstan, Kurdistan, Qatar, Uganda, Kenya and Congo and including the giant Kashagan development in the Caspian Sea. Closer to home, Graham led Southern North Sea concept engineering for Shell in Lowestoft including developing what was believed to be the world-first fully renewably powered wellhead platform, fifteen years before offshore wind technology became mainstream.

On the same day he became a Liveryman, Graham left New Age and set out as a freelance consultant, also since becoming a founding Associate of the Travivas network of independent consultants. He is currently advising projects in Egypt and Kurdistan and is enjoying finally having time to pursue a variety of other engineering interests, to coach A level chemistry and to do more as a registered STEM Ambassador.

Graham met his wife, Emma, while both singing in a chamber choir in Norwich. They still sing both at All



Saints Weston in Surrey, where Graham is also organist, and with VOCE (Voices of Cambridge Ensemble), a chamber choir predominantly comprising ex-Cambridge choral scholars. They have a ten year old daughter, Harriet who, if Lego is a good indicator, already shows promising signs of continuing the engineering tradition.

A past advocate for waxy oil export by rail and Lighter-than-Air logistics in East Africa, Graham has always enjoyed identifying and evaluating novel upstream engineering concepts and looks forward to accessing the Company's enormous breadth and depth of engineering experience to continue to broaden his horizons.

John Dyson

CEng FICHEM



I am a 50 something ex-Chemical now PowerPoint Engineer. Graduating from Surrey University in 1985 I cut my "engineering teeth" as a process engineer at Air Products, had a brief sojourn brewing before re-joining the oil & gas industry with Genesis Oil & Gas consultants in 1997.

Since 2016 I have been the CEO at a new start consulting company, io, based in the Shard. I have three adult daughters (Emily 27, Sarah 25 and Isabel 24) and I live in Kingston with my new partner Carla, also an ex-engineer.

I am an avid Harlequins fan so am used to disappointment; I like to ski, hike (having completed the Pennine Way in 2010 and the Nakasendo Way in 2014) and mess about on and in the water. My current aspiration / obsession / project is to find and own a narrowboat. I joined the Engineers for the smashing company, the interesting stories and to try and give back to the profession that has provided me with such a great career.

Christopher Earnshaw

OBE CEng FEng FIET



Unsurprisingly, after a mis-spent youth experimenting with radios and all things electronic, Chris was destined to become an engineer.

He was awarded a sponsorship from the Post Office when he left school and after a year learning the ropes (and holes and poles) he studied Physics at Sheffield University. Following graduation in 1976, he joined the team developing the System X digital switching system. Subsequently he was responsible for the deployment of all digital technologies in BT's UK network and joined the board of BT UK in 1989 and eventually international networks. In the early 1990s he relocated to the USA to establish a joint venture company. He returned to the UK in 1995 as Managing Director Network and Systems and Group Engineering Director.

Since leaving BT in 2002, he has built a non-executive portfolio career. He was chairman of the Police IT Organisation (2004-07) and is non-executive chairman of the BRE Group and chairman of Cranfield Aerospace Solutions Ltd.

Chris has been involved in supporting continuing professional development and excellence in engineering throughout his career. He has been an active member of the Institution of Engineering and Technology since 1972 and was President 2008-09. He was elected a Fellow of the Royal Academy of Engineering in 1999 and awarded the OBE in 2015 for services to Engineering and Technology.

In his spare time Chris enjoys the great outdoors, walking, gardening and has an interest in national heritage.



Amarjit Dhillon

BEng (Hons) FBCS MIET



Amarjit is the Chief Information Officer at Turning Point which is a leading health and wellbeing organisation. He is directing strategic change to improve the reach and breadth of healthcare service delivery by incorporating technology into all aspects of the value chain including therapeutic functions and new product development as well as underpinning services and the team has been privileged to receive recognition from industry. Novel techniques are applied and leading edge technology is being developed and deployed to build on the quality of service that is already delivered and to reach people before illness and disease takes hold or worsens.

With both children now at university and a little more independent, leisure time is taken up by clay pigeon shooting, membership of the National Trust, visits to the theatre and cinema and improving cooking skills under the supervision of wife Manjit.

Travel remains an interest with a constant yearn for warmer climes. With much of the family over in the USA an American accent is always present in and around my surroundings. Visiting and travelling is great but there is no place like home!

Nigel Hobson

CEng FIChemE

Nigel has spent all his career to date in the oil industry where he is currently Vice President Global Operations for Shell's Trading and Supply Business based in London. This follows two recent assignments as Vice President Supply & Distribution for Europe and Africa based in London and with Shell's Chemicals business as

Vice President Global Operations based in the Netherlands. Nigel graduated from Exeter University with a First Class Degree in Chemical Engineering from where he joined ExxonMobil prior to joining Shell.



During any free time Nigel can often be found on the banks of a river fly fishing from the Trout chalk streams of Southern England to the Sea Trout rivers of West Wales to the Salmon rivers in Scotland. Nigel enjoys many other outdoor pursuits with his family and is also a fair weather sailor and has recently qualified as an open water diver.

Welcome to three new liverymen clothed at the Court Meeting on 9 January 2018.

Alan Howell

BSc, MSc, CEng, FIET

Alan has been fortunate enough to work most of his career in the conceptualisation, design and development of satellite communications systems. Alan first started his space engineering career with British Aerospace in 1981 working on several European Space Agency (ESA) satellite programmes including Giotto and Olympus. Moving to Inmarsat Global in 1985 he led developments for a total of 21 satellite programs focussing on the full 'end to end' system including communications payload and spacecraft design, groundstation and IP network deployment together with user terminal development. Alan's proudest moment was to be a member of the team who were awarded the MacRobert Award in June 2010 by the Royal Academy of Engineering for the development of the first 3G



next role was Managing Director of an Inspection Company covering the UK and Europe together with assisting in acquisitions in the US.

Finally twenty five years ago Terry and his wife Pauline purchased a small construction company developing it with his two engineer sons to become a leading installer of bridge deck waterproofing systems, bridge expansion joints and protective coatings throughout the UK. Notable projects being London Bridge, Northern Hub, Forth Road Bridge, LUL Term contract.

Terry was a member of Network Rail specialist group for protective coatings and waterproofing and worked as a consultant with the TRL to produce a practical waterproofing guide for Network Rail project managers.

He has spent many years sailing around the Western Isles, enjoying a round of golf and taking country walks. He has mentored for the Princes Trust and continues to support their activities.

compatible global mobile satellite network known as BGAN (Broadband Global Area Network).

In his spare time Alan likes to work on classic cars, particularly his 1970 Triumph TR6 which he spends as much time maintaining and not enough time driving! Alan is also a keen sailor and member of Itchenor sailing club who jointly owns an 11 metre sailing yacht which is frequently used for sailing across to France and the Channel islands when the winds are fair.

Terence Weston

CEng FIMechE



Terry's career has taken him from a Project Engineer with BOC designing and supervising structures in Northern Ireland and the North East to a Mechanical Engineer with ICI controlling maintenance depots on their Wilton Works. This was followed by becoming a Construction Engineer with Foster Wheeler Power Products working in Saudi Arabia, Zimbabwe, Shetlands and the UK, investigating and building power plants. His

Graham Michael Peace

MSc CEng FIET IEEE

Graham Peace – is a chartered engineer (CEng FIET), Fellow of the IET, senior member of the IEEE (SMIEEE) and holds an MSc degree in Telecommunications from University College London (UCL). He has in excess of 35 years continuous professional software, systems and hardware experience, gained working internationally with many high-profile clients.

For the last 21 years, I have worked as an independent software consultant, developing a number of emerging technologies, including mobile phones, internet-based networks, smart metering, the Internet of Things (IoT) and formula 1. My career highlights include the development of the first 3G phone capable of making live video calls, which was a key driver to the launch of 3G in the UK. In recent years, I have been working as an expert witness, supporting a number of law firms in the field of patent IPR litigation and I am a university certified expert witness.

I am a keen practitioner of continuous professional development and life-long learning, building on my skill



decade at the ‘sharp end’ of civil engineering construction, during which time developed a taste for wrestling with the nuances of contract law and dispute resolution. He went on to undertake postgraduate studies in law at the College of Law, London, becoming a member of the Chartered Institute of Arbitrators. An MBA from Bristol Business School followed.

He became Principal Engineer in the public sector in Cambridgeshire in 1988, then seven years as Director of Environmental Services in Somerset, whilst chairing a national European Affairs Committee. Subsequently he became ICE Director International.

In 2003, John was made Director General of the International Cotton Association, the regulatory and arbitral authority for the US\$70billion annual value commodity trade.

He fulfilled another ambition by becoming Chief Executive of the Church of England Diocese of Manchester in 2008, inheriting responsibility for four Bishops, 400 clergy, 365 churches, 195 church schools and a vast property portfolio, retiring in 2011. John has been Hon. Secretary of IESF since 2001 and its President in 2011. He lives in rural Cheshire with his wife Frances, has one son who is a lawyer and two grandchildren.

set and staying current with emerging technologies, including 5G. At the IET, I volunteer as a professional review interviewer of CEng and IEng candidates.

In my spare time, I enjoy walking, cooking (eating!) and travel.

Welcome to four new liverymen clothed at the Court Meeting on 6 March 2018.

John Robert Beck

MBA CEng FICE FRICS MASCE MCI Arb DipLaw



John was educated at Liverpool Collegiate School and started his engineering training in industrial Lancashire before embarking on full-time academic studies. He became a Chartered Civil Engineer in 1984 and Chartered Surveyor a few years later. After an early career in engineering design, John enjoyed more than a

Christopher Bakken

BSc MSc CEng FIET



Professionally, I have always worked in the commercial nuclear industry. I started as a commissioning engineer right out of university and have been involved in all aspects of operations, engineering, maintenance and



construction of nuclear power plants. My time in the UK was spent supporting the AGRs and developing the HPC new build project. Currently, I have responsibility for the second largest nuclear fleet in America. I look forward to having the opportunity to contribute in my field again in the UK.

On a more personal note, my wife Katie and I enjoy wildlife photography, particularly big African game.

My other interests include woodworking, shooting sports and HO model trains. I have a wood machine shop and enjoy making furniture and repairing things. I enjoy sporting clays and precision rifle shooting, loading my own cartridges and the engineering of it all.

I have owned Marklin trains since I was a small boy in Switzerland. Now that I am a big boy, I have hundreds of locomotives to run about my layouts. The train collection started with Katie asking me to set up a track under the Christmas tree. That rejuvenated my childhood interests and with the help of e-Bay the rest is history!

Eur Ing Grahame Barwell

BSc(Eng) CEng FICE



My engineering education started at a very young age.

I fondly remember my first engineering lesson, the principles of which I carried with me throughout my professional, (and DIY), career.

It was delivered by my father, himself a Chartered Engineer and lecturer in mechanical and electrical engineering, when the flat pack bomb shelter arrived from Mr Anderson.

‘Now,’ said Dad, ‘before we do anything else, we read the instructions (contract documents). Now we read them again. Plan the work, (contract programme). Check that we have all the tools, (labour, plant and temporary materials), required. Check the site dimensions, (site survey).’

‘Only then, we unpack and check the supplies and arrange them in assembly order,’ (the supply chain). ‘Uncle Jim,’ (labour only sub- contractor), will help with the heavy corrugated sheets. Your job, (indentured pupil), is site storekeeper. You hand me the bolts, nuts and washers as I call for them. All clear?’

‘Yes Dad’.

‘This is going to take all day. You can’t expect him to do that,’ said my Mum, (site caterer & tea lady). ‘He’s only five.’

‘No I’m not,’ I said indignantly. ‘I’m five and three quarters!’

SAD DEPARTURES

The Company has been informed of the following members who have died.

Sir Edward John Cullen FREng, FICChemE.

John Court Levy OBE, FREng, FIMechE, FRAeS.

William Hilton Wright MA, CEng, FIET.

The wives of two Past Masters have died recently.

Lady Elizabeth Brenda Rooke, widow of Sir Denis Rooke OM CBE FRS FREng (Master 1985-86) died on 26 October 2017, aged 95, mother of Diana and mother-in-law of the current Junior Warden Dr Peter Blair-Fish. The Engineers’ Company was represented at her cremation by Richard Groome (then Master); Barry Brooks (then Middle Warden); Past Master Raymond Cousins and Ruth Cousins; and Past Master Sir David Davies and Lady Davies.

Lady Elaine Barlow, widow of Sir William Barlow FREng (Master 1986-87) died on 31 December 2017 after a short illness. The Engineers’ Company was represented by PM Rear Admiral Peter Hammersley at the funeral service.

DATE	FORTHCOMING EVENTS	VENUE
10/05/2018 18:00	Master's Lecture and Evening Reception	Information Technologists Hall
14/05/2018 12:30	Almoners Lunch (Invitation Only)	RAF Club
15/05/2018 00:00	Festival of the Sons of the Clergy	St Pauls Cathedral
19/05/2018 10:00	8th Informal Walk - New Forest	The New Forest
11-13/06/2018 00:00	11-13 June 2018 Visit to HMS Anson and Sellafield	Cumbria (Cdre Barry Brooks RN)
20/06/2018 10:30	Junior Wardens Lecture and Lunch	HQS Wellington
25/06/2018 10:00	Election of Sheriffs & Lunch	Guildhall
03/07/2018 11:30	Visit to Raspberry Pi Factory	Sony Plant, Pencoed Wales
10/07/2018 16:30	Court Meeting	Plasterers' Hall
10/07/2018 18:00	Awards Ceremony & Dinner	Plasterers' Hall
20/07/2018 19:00	Hampton in Arden Informal Dinner	Hampton Hotel (Penny Taylor)
20-23/09/2018 18:00	Master's Out Of Town	Derbyshire & Peak District
01/10/2018 00:00	Election of The Lord Mayor	TBA
03/10/2018 12:30	Ladies Lunch	TBA
08/10/2018 16:30	Court Meeting	Information Technologists Hall
08/10/2018 18:45	Court Dinner Without Partners	Information Technologists Hall
26/10/2018 19:00	Annual Banquet	Mansion House
10/11/2018	Lord Mayor's Show and fireworks	Informal dinner at the Wharf
14/11/2018	Open evening	Information Technologists Hall
10/12/2018 18.00	Carol Service at Chapel Royal, Tower of London	Dinner at the Clothworkers' Hall

Booking is essential for all events. Members of the Company should use Web Office <http://wcmember.azurewebsites.net/> for all main events. Queries for other events should be sent to the organiser.